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A Siemens Company

KinetDx WS3000 Ultrasound Workstation

DICOM Conformance Statement

Revision: 3.0

Revision History

Revision	Date	Author	Reason for Change
1.0	01/25/00	Dave Hall	First version.
2.5	05/01/01	Brian Ferguson	Update for Print Manager conformance and Media Interchange Support.
2.8	09/10/01	Brian Ferguson	Update for 2.8 Software Release.
2.8.1	02/28/02	Brian Ferguson	Updated for Printer Status of 'Warning'
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3.0	06/26/02	Brian Ferguson	Updated for 3.0 Software Release.

Table of Contents

1. INTRODUCTION 5
1.1 Purpose of this Document 5
1.1.1 Image Display Support 5
1.1.2 Image Display Support (Hardware) 6
1.2 Sources for this Document 6
1.3 Acronyms and Abbreviations 7
2. NETWORK CONFORMANCE STATEMENT 8
2.1 Introduction 8
2.2 Implementation Model 8
2.2.1 Application Data Flow Diagram 8
2.2.2 Functional Definition of Application Entities 8
2.2.3 Sequencing of Real World Activities 9
2.3 Application Entity Specifications 9
2.3.1 Print Manager Application Entity Specification 9
2.3.1.1 Association Establishment Policies 9
2.3.1.1.1 General 9
2.3.1.1.2 Number of Associations 9
2.3.1.1.3 Asynchronous Nature 9
2.3.1.1.4 Implementation Identifying Information 9
2.3.1.2 Association Initiation by Real-World Activity 9
2.3.1.2.1 Real-World Activity – Print 9
2.2.1.3 Association Acceptance Policy 14
2.3 Communication Profiles 14
2.3.1 Supported Communications Stacks 14
2.3.1 OSI Stack 14
2.3.3 TCP/IP Stack 14
2.3.3.1 Physical Media Support 14
2.3.4 Point-to-Point Stack 14
2.4 Extensions/Specializations/Privatizations 14
2.5 Configuration 14
2.5.1 AE Title/Presentation Address Mapping 14
2.5.2 Configurable Parameters 14
2.6 Support of Extended Character Sets 14
3. MEDIA STORAGE CONFORMANCE STATEMENT 15
3.1 Introduction 15
3.2 Implementation Model 15
3.2.1 Application Data Flow Diagram 15
3.2.1.1 Description of the Data Flow Diagram for the CD-R device. 15
3.2.1.2 Description of the Data Flow Diagram for the CDROM device. 15
3.2.1.3 Description of the Data Flow Diagram for the MOD device. 16
3.2.2 Functional Definition of Application Entities 17
3.2.3 Sequencing of Real World Activities 17
3.2.4 File Meta Information for Implementation Class and Version 17
3.3 Application Entity Specifications 17
3.3.1 Display/Edit Application Entity Specification 17
3.3.1.1 File Meta Information for Display/Edit Application Entity 19
3.3.1.2 Real World Activities for the Display/Edit Application Entity 19
3.3.1.2.1 Real World Activity: Display Directory 19
3.3.1.2.2 Real World Activity: View Images 19
3.3.1.2.3 Real World Activity: Copy to Local Storage 20
3.3.1.2.4 Real World Activity: Update Studies 20
3.3.1.2.5 Real World Activity: Create MOD 20
3.3.1.2.6 Real World Activity: Create CD-R 21

3.4 Augmented and Private Application Profiles 21
3.5 Extensions/Specializations/Privatizations 21
3.6 Configuration 21
3.7 Support of Extended Character Sets 21

List of Tables

Table 1.1-1 Software Review Supported Image Formats 6
Table 1.1-2 DAP Photometric Interpretation / Transfer Syntax Support 6
Table 1.1-3 DAP Supported Image Size, Format and Aspect Ratio 6
Table 2.3-1 KinetDx WS3000 Print Manager Supported SOP Classes 9
Table 2.3-2 Proposed Presentation Contexts - Print (Grayscale Printer) 10
Table 2.3-3 Grayscale Print Management Meta SOP Class 10
Table 2.3-4 Basic Film Session SOP Class DIMSE Services 10
Table 2.3-5 Supported Basic Film Session SOP Class Elements 11
Table 2.3-6 Basic Box Session SOP Class DIMSE Services 11
Table 2.3-7 Supported Basic Film Box SOP Class Elements 12
Table 2.3-8 Supported DIMSE Services for Basic Grayscale Image Box SOP Class 12
Table 2.3-9 Supported DIMSE Services for Printer SOP Class 12
Table 2.3-10 Supported Printer SOP Class Elements 12
Table 2.3-11 Proposed Presentation Contexts - Print (Color Printer) 13
Table 2.3-12 Basic Color Print Management Meta SOP Class 13
Table 2.3-13 Supported DIMSE Services for Basic Color Image Box SOP Class 13
Table 3.3-1 Display/Edit Application Entity Profiles, Real-World Activities, and Roles 18
Table 3.3-2 Supported Media Storage SOP Classes 19
Table 3.3-3 Media Review Supported Image Formats 20

List of Figures

Figure 2.2-1 KinetDx Workstation Implementation Model 8
Figure 3.2-1 CD-R Implementation Model 15
Figure 3.2-2 CDROM Implementation Model 16
Figure 3.2-3 MOD Implementation Model 16

1. INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This document is a DICOM Conformance Statement for the KinetDx WS3000 Ultrasound Workstation.

The KinetDx WS3000 Workstation is an ultrasound review station that provides diagnostic display of DICOM Images conforming to the Ultrasound Image Storage, Ultrasound Multi-frame Image Storage and Secondary Capture SOP Classes. DICOM Images conforming to the CT Image Storage, MR Image Storage and X-Ray Angiographic SOP Classes can be displayed for reference review. The WS3000 Workstation is part of the Acuson KinetDx System product line and is designed to operate in conjunction with the KinetDx Server. The WS3000 Workstation and the KinetDx Server use DICOM as an external interface standard. Other non-DICOM internal communication mechanisms between the WS3000 Workstation and the KinetDx Server are used for the display of images.

The WS3000 Workstation provides support for the DICOM US Calibration Module. When ultrasound images contain this module, the WS3000 Workstation is able to interpret the region calibration data provided by the ultrasound acquisition unit.

The WS3000 Workstation has the following explicit DICOM capabilities:

- Prints images to DICOM Printers, acts as a Service Class User of the Print Management Services
- Reads Studies from DICOM Media Storage, a File-set Reader
- Writes Studies to DICOM Media Storage, a File-set Updater
- Deletes Studies from DICOM Media Storage, a File-set Updater
- Creates a DICOMDIR on DICOM Media Storage, a File-set Creator

1.1.1 Image Display Support

The WS3000 Workstation displays ultrasound, secondary capture, computed tomography, magnetic resonance, and x-ray angiographic images from the KinetDx Server or from supported DICOM media.

The WS3000 Workstation supports the image formats shown in Table 1.1-1 when displaying images using software. The WS3000 Workstation supports the display of 8, 10, 12 and 16 bit image formats.

Photometric Interpretation	Transfer Syntax	Planar Configuration
MONOCHROME2	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	N/A
	Uncompressed Implicit VR Little Endian 1.2.840.10008.1.2	N/A
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	N/A
	JPEG Lossy Baseline (Process 1) 1.2.840.10008.1.2.4.50	N/A
	JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.70	N/A
RGB	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	0 and 1
	Uncompressed Implicit VR Little Endian 1.2.840.10008.1.2	0 and 1
PALETTE COLOR	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	N/A
	Uncompressed Implicit VR Little Endian 1.2.840.10008.1.2	N/A
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	N/A

Photometric Interpretation	Transfer Syntax	Planar Configuration
YBR_FULL	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	1
	Uncompressed Implicit VR Little Endian 1.2.840.10008.1.2	1
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	1
	JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.70	1
YBR_FULL_422	JPEG Lossy Baseline (Process 1) 1.2.840.10008.1.2.4.50	1

Table 1.1-1 Software Review Supported Image Formats

1.1.2 Image Display Support (Hardware)

The WS3000 Workstation provides compressed image display using the Acuson Dynamic Array Processor (DAP). The DAP board provides hardware decompression of compatible compressed image types. The image formats shown in Tables 1.1-2 and 1.1-3 are supported for image display using the Dynamic Array Processor.

If the image to be displayed does not match the format indicated in the tables below, the WS3000 Workstation will display the image using software decompression support.

Photometric Interpretation	Transfer Syntax	DAP1 Support	DAP2 Support
Monochrome2	JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.70	No	Yes
YBR_FULL_422	JPEG Lossy Baseline (Process 1) 1.2.840.10008.1.2.4.50	Yes	Yes

Table 1.1-2 DAP Photometric Interpretation / Transfer Syntax Support

Image Size	Format	Aspect Ratio	DAP1 Scaling Support			DAP2 Scaling Support		
			1x	.5x	2x	1x	.5x	2x
640X480	JPEG Lossy	1.0	X	X		X	X	X
576x456	JPEG Lossy	1.0	X	X		X	X	X
320x240	JPEG Lossy	1.0	X		X	X		X
288x228	JPEG Lossy	1.0	X		X	X		X
768x576	JPEG Lossy	1.0	X	X		X	X	X
692x547	JPEG Lossy	1.0	X	X		X	X	X
384x288	JPEG Lossy	1.0	X		X	X		X
480x430	JPEG Lossy	0.8	X	X		X	X	X
240x430	JPEG Lossy	0.8	X			X	X	X
240x216	JPEG Lossy	0.8	X			X		X
234x188	JPEG Lossy	1.0	X		X	X		X
304x256	JPEG Lossy	1.0	X	X		X	X	X
456x368	JPEG Lossy	1.0	X	X		X	X	X
560x412	JPEG Lossy	1.0	X	X		X	X	X
640x476	JPEG Lossy	1.0	X	X		X	X	X
512x512	JPEG Lossless	1.0				X	X	X
1024x1024	JPEG Lossless	1.0				X	X	X
346x274	JPEG Lossy	1.0				X		X
320x232	JPEG Lossy	1.0				X		X
636x434	JPEG Lossy	1.0				X	X	X

Table 1.1-3 DAP Supported Image Size, Format and Aspect Ratio

1.2 SOURCES FOR THIS DOCUMENT

ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) Version 3.0 Parts 1 – 14.

1.3 ACRONYMS AND ABBREVIATIONS

The following Acronyms and abbreviations are used in this document:

- ACR — American College of Radiology
- AE — Application Entity
- DICOM — Digital Imaging and Communications in Medicine
- FSC — File-set Creator
- FSR — File-set Reader
- FSU — File-set Updater
- NEMA — National Electrical Manufacturers Association
- PDU — Protocol Data Unit
- SCP — Service Class Provider
- SCU — Service Class User
- SOP — Service Object Pair
- TCP/IP — Transmission Control Protocol/Internet Protocol
- UID — Unique Identifier

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM conformance statement specifies the compliance to the DICOM conformance requirements for the relevant Networking features of the KinetDx WS3000 Workstation. Note that the format of this section strictly follows the format described in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

The KinetDx WS3000 Workstation is a medical imaging workstation designed to provide diagnostic review of ultrasound images and reference review of CT, MR and X-Ray Angiographic images. It operates in conjunction with the KinetDx Server for retrieval and display of images. Refer to the KinetDx DS3000 DICOM Server DICOM Conformance Statement for a description of the KinetDx Server's DICOM capabilities.

This station uses DICOM services to print images to DICOM Printers.

2.2 IMPLEMENTATION MODEL

The KinetDx WS3000 Workstation DICOM Service is implemented as a separate process that can initiate associations with remote Application Entities. The Service is started automatically during system start-up and will remain active until system shut down.

2.2.1 Application Data Flow Diagram

The Implementation Model for the KinetDx WS3000 Workstation DICOM network services is shown in Figure 2.1-1.

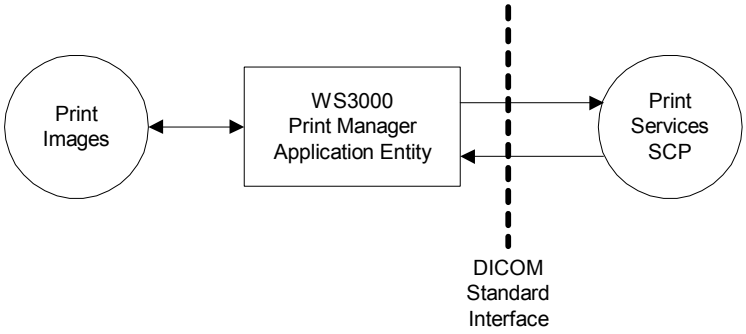

Figure 2.2-1 KinetDx Workstation Implementation Model

2.2.2 Functional Definition of Application Entities

The Application Entity of the KinetDx WS3000 Print Manager acts as an SCU for the basic grayscale and color print management meta SOP classes. The user can print selected images or all images in a series to a DICOM printer.

The KinetDx WS3000 Print Manager Application Entity operates in conjunction with two files for each printer.

The Printer Template file describes the capabilities of a particular printer. The Printer Template file resides on the KinetDx Server and is identical for all KinetDx WS3000 Workstations that connect to the KinetDx Server.

The Printer Descriptor file describes the default settings for the specific printer. A graphical user interface is available to allow configuration of the default settings.

2.2.3 Sequencing of Real World Activities
Not Applicable

2.3 APPLICATION ENTITY SPECIFICATIONS

2.3.1 Print Manager Application Entity Specification
The WS3000 Print Manager Application provides standard conformance to the following DICOM V3.0 SOP Classes as an SCU.

SOP Class	SOP Class UID
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18

Table 2.3-1 KinetDx WS3000 Print Manager Supported SOP Classes

2.3.1.1 Association Establishment Policies
The WS3000 Print Manager Application will initiate an association with the configured DICOM Print SCP. The WS3000 Print Manager Application does not accept associations.

2.3.1.1.1 General
The Print Manager Application offers a maximum PDU size of 32 KB (32,768 bytes) upon association initiation.

2.3.1.1.2 Number of Associations
The WS3000 Print Manager Application will queue multiple print jobs such that it only establishes one association as an SCU at a time when it manages multiple DICOM printer destinations.

2.3.1.1.3 Asynchronous Nature
The WS3000 Print Manager Application does not support asynchronous operations.

2.3.1.1.4 Implementation Identifying Information
The WS3000 Print Manager Application uses the following implementation identifying parameters:

- Implementation Class UID 1.2.840.113680.19.1
- Implementation Version Name DS19.1_

2.3.1.2 Association Initiation by Real-World Activity
The WS3000 Print Manager Application initiates associations for the following activities:

The user wants to print grayscale images to a DICOM printer.
The user wants to print color images to a DICOM Printer

2.3.1.2.1 Real-World Activity – Print

2.3.1.2.1.1 Associated Real World Activity - Print
An association is established when the user initiates a print operation from the graphical user interface. Individual images, a range of images, or the entire study can be sent to the configured DICOM Print device. The association is opened when the first image is transferred and closed when the last image transfer is complete. The user can choose several parameters such as the layout of the film and number of copies to be printed. The WS3000 Print Management Application interprets a Printer Status of 'WARNING' the same as a 'FAILURE'. For correct operation the DICOM Print device should be configured not to return a Printer Status of 'WARNING' for routine operations.

2.3.1.2.1.2 Proposed Presentation Contexts - Print (Grayscale Printer)

The WS3000 Print Management Application will propose the Presentation Contexts shown in Table 2.3-2.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscales Print Management Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 2.3-2 Proposed Presentation Contexts - Print (Grayscale Printer)

2.3.1.2.1.2.1 SOP Specific Conformance to Basic Grayscale Print Management Meta SOP Class

The WS3000 Print Management Application provides standard conformance to the Grayscale Meta SOP classes as an SCU. All mandatory elements of these classes are supported. Specifically, with respect to the Basic Grayscale Print Management Meta SOP class this means conformance to the underlying SOP classes shown in Table 3.2-3.

Supported SOP classes as Basic Grayscale Print Management Meta SOP Class	
SOP Class Name	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Printer	1.2.840.10008.5.1.1.16

Table 2.3-3 Grayscale Print Management Meta SOP Class

2.3.1.2.1.2.1.1 SOP Specific Conformance to Basic Film Session SOP Class

The WS3000 Print Management Application provides standard conformance to the Basic Film Session SOP Class as an SCU.

DICOM specified usage:

M = Mandatory
U = User Option

Supported DIMSE Services are shown in table 2.3-4.

Name	Usage	Description
N-Create	M	Creates the Film Session.
N-Set	U	Not used.
N-Delete	U	Deletes the Film Session.
N-Action	U	Not used.

Table 2.3-4 Basic Film Session SOP Class DIMSE Services

Supported Basic Film Session SOP Class Elements are shown in Table 2.3-5.

Attribute Name	Attribute Tag	Usage	Valid Range
Number of Copies	(2000,0010)	U	1 - 99
Print Priority	(2000,0020)	U	HIGH MED LOW
Medium Type	(2000,0030)	U	BLUE FILM CLEAR FILM

Attribute Name	Attribute Tag	Usage	Valid Range
			PAPER CURRENT
Film Destination	(2000,0040)	U	PROCESSOR MAGAZINE
Film Session Label	(2000,0050)	U	Incrementing Integer created by Print Manager Application

Table 2.3-5 Supported Basic Film Session SOP Class Elements

2.3.1.2.1.2.1.2 SOP Specific Conformance to Basic Film Box SOP Class
The WS3000 Print Management Application provides standard conformance to the Basic Film Box SOP Class as an SCU.

DICOM specified usage:

M = Mandatory
U = User Option

Supported DIMSE Services are shown in table 2.3-6.

Name	Usage	Description
N-Create	M	Creates the Film Box.
N-Set	U	Not used.
N-Delete	U	Deletes the Film Box. Issued after film is printed.
N-Action	M	PRINT. Sent after each Film Box is filled and to print a partially filled Film Box.

Table 2.3-6 Basic Box Session SOP Class DIMSE Services

Supported Basic Film Box SOP Class Elements are shown in Table 2.3-7.

Attribute Name	Attribute Tag	Usage	Valid Range
Film Orientation	(2010,0040)	U	PORTRAIT LANDSCAPE
Film Size ID	(2010,0050)	U	8INX10IN 14INX17IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 24CMX24CM 24CMX30CM
Magnification Type	(2010,0060)	U	REPLICATE BILINEAR CUBIC NONE
Border Density	(2010,0100)	U	BLACK WHITE
Empty Image Density	(2010,0110)	U	BLACK WHITE
Min Density	(2010,0120)	U	0 - 1000
Max Density	(2010,0130)	U	0 - 1000
Trim	(2010,0140)	U	YES, NO

Table 2.3-7 Supported Basic Film Box SOP Class Elements

2.3.1.2.1.2.1.3 SOP Specific Conformance to Grayscale Image Box SOP Class

The WS3000 Print Management Application provides standard conformance to the Grayscale Image Box SOP Class as an SCU. No optional attributes are supported for the Basic Grayscale Image Box SOP Class.

DICOM specified usage:

M = Mandatory
U = User Option

Supported DIMSE Services are shown in table 2.3-8.

Name	Usage	Description
N-Set	M	The SCP for each potential image of the film box creates an image box instance. Only those instances that actually contain images will be updated with the N-SET message.

Table 2.3-8 Supported DIMSE Services for Basic Grayscale Image Box SOP Class

2.3.1.2.1.2.1.4 SOP Specific Conformance for Printer SOP Class

The WS3000 Print Management Application provides standard conformance to the Printer SOP Class as an SCU.

DICOM specified usage:

M = Mandatory
U = User Option

Supported DIMSE Services are shown in table 2.3-9.

Name	Usage	Description
N-Event-Report	M	Ignored and not handled.
N-Get	U	Issued prior to creating the Print Session to get printer status.

Table 2.3-9 Supported DIMSE Services for Printer SOP Class

Supported Printer SOP Class Elements are shown in Table 2.3-10.

Attribute Name	Attribute Tag	Usage	Valid Range
Manufacturer	(0008,0070)	U	Vendor Specific
Manufacturer's Model	(0008,1090)	U	Vendor Specific
Software Version(s)	(0018,1020)	U	Vendor Specific
Printer Status	(2110,0010)	U	NORMAL WARNING (See Note) FAILURE
Printer Name	(2110,0030)	U	Vendor Specific

Table 2.3-10 Supported Printer SOP Class Elements

Note: The WS3000 Print management Application does not support a Printer Status of 'WARNING'. This status is interpreted the same as 'FAILURE' and the print operation will not proceed. The DICOM Print device should be configured not to return a Printer Status of 'WARNING' for routine operation.

2.3.1.2.1.3 Proposed Presentation Contexts - Print (Color Printer)

The WS3000 Print Management Application will propose the Presentation Contexts shown in Table 2.3-11.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 2.3-11 Proposed Presentation Contexts - Print (Color Printer)

2.3.1.2.1.3.1 SOP Specific Conformance to Basic Color Print Management Meta SOP Class

The WS3000 Print Management Application provides standard conformance to the Basic Color Print Management Meta SOP classes as an SCU. All mandatory elements of these classes are supported. Specifically, with respect to the Basic Color Print Management Meta SOP class this means conformance to the underlying SOP classes shown in Table 2.3-12.

Supported SOP classes as Basic Color Print Management Meta SOP Class	
SOP Class Name	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Color Image Box	1.2.840.10008.5.1.1.4.1
Printer	1.2.840.10008.5.1.1.16

Table 2.3-12 Basic Color Print Management Meta SOP Class

The WS3000 Print Management Application makes identical use of the Basic Film Session SOP Class, Basic Film Box SOP Class and Printer SOP Class elements that have been previously described for grayscale image printing. Therefore these will not be described again in this section on color printing. However, it should be noted that certain attributes defined in the Basic Film Session SOP Class (i.e. Medium Type) are likely to require printer/print server specific media.

2.2.1.2.1.3.1.1 SOP Specific Conformance to Basic Color Image Box SOP Class

The WS3000 Print Management Application provides standard conformance to the Basic Color Image Box SOP Class as an SCU. No optional attributes are supported for the Basic Color Image Box SOP Class.

DICOM specified usage:

M = Mandatory
U = User Option

Supported DIMSE Services are shown in table 2.3-13.

Name	Usage	Description
N-Set	M	The SCP for each potential image of the film box creates an image box instance. Only those instances that actually contain images will be updated with the N-SET message.

Table 2.3-13 Supported DIMSE Services for Basic Color Image Box SOP Class

2.2.1.3 Association Acceptance Policy
The WS3000 Print Manager Application does not accept associations.

2.3 COMMUNICATION PROFILES

2.3.1 Supported Communications Stacks
The KinetDx WS3000 Workstation provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

2.3.1 OSI Stack
Not supported.

2.3.3 TCP/IP Stack
The WS3000 Print Manager uses the TCP/IP stack from the Microsoft Windows NT operating system upon which it executes.

2.3.3.1 Physical Media Support
The WS3000 Print Manager is not dependent on the physical medium over which the TCP/IP executes.

2.3.4 Point-to-Point Stack
Not Supported.

2.4 EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

The KinetDx WS3000 Workstation has no extensions, specializations or privatizations of SOP Classes and Transfer Syntaxes.

2.5 CONFIGURATION

The configuration of the WS3000 Print Manager Application is stored in the Windows NT Registry. Support personnel typically perform configuration changes.

2.5.1 AE Title/Presentation Address Mapping
The AE Title for the WS3000 Print Manager is the NetBIOS Name of the computer. This parameter can be configured via the graphical user interface of the host and is limited to 15 characters.

For systems with which the WS3000 Print Manager acts as an SCU, the following information is needed:

The AE Title
The IP address
The listening port number

This information is used to create the Printer Descriptor file that is stored on the KinetDx Server.

2.5.2 Configurable Parameters
Not Applicable

2.6 SUPPORT OF EXTENDED CHARACTER SETS

The KinetDx WS3000 Workstation supports the following character sets:

- ISO-IR 6 (default) Default repertoire
- ISO-IR 100 Latin Alphabet No. 1

The KinetDx WS3000 Workstation does not support multi-byte characters.

3. MEDIA STORAGE CONFORMANCE STATEMENT

3.1 INTRODUCTION

This section specifies the KinetDx WS3000 compliance to the DICOM Media Interchange. It details the DICOM Media Storage Application Profiles and roles that are supported.

This station provides DICOM interchange capabilities on CD-Rs (Compact Disk – Recordable) on CDROMs (Compact Disk Read Only Memory) and on MODs (Magneto Optical Disc) with different application profiles supported for each media.

Note that the format of this section strictly follows the format described in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

3.2 IMPLEMENTATION MODEL

3.2.1 Application Data Flow Diagram

The Basic and Specific Application models for the CD-R device, the CDROM device and the MOD device are shown in the following illustrations:

3.2.1.1 Description of the Data Flow Diagram for the CD-R device.

The Display/Edit Application Entity (AE) handles the Directory Display, Image Viewing, Study Updating, Study Copying and CD-R Creation functionality for the CD-R device. The Display/Edit Application Entity (AE) is commanded by the user to perform DICOM Services operating on the DICOM media through the use of buttons and menu selections on the graphical user interface of the station.

The Application models for the CD-R device are shown in Figure 3.2-1.

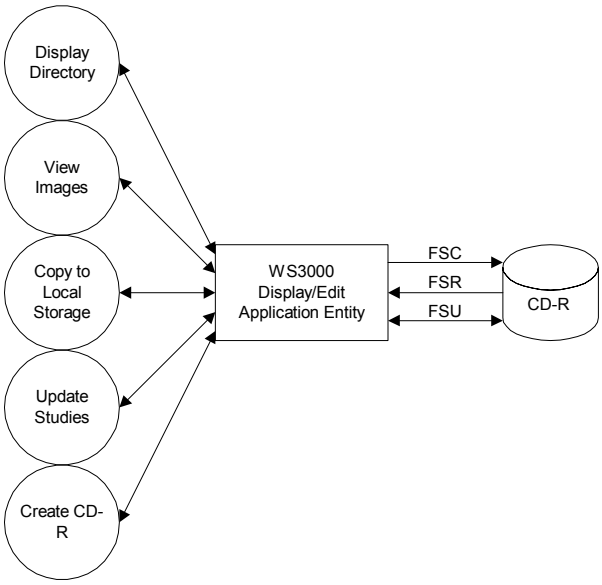

Figure 3.2-1 CD-R Implementation Model

3.2.1.2 Description of the Data Flow Diagram for the CDROM device.

The Display/Edit Application Entity (AE) handles the Directory Display, Image Viewing, and Study Copying functionality for the CDROM device. The Display/Edit Application Entity (AE) is commanded by

the user to perform DICOM Services operating on the DICOM media through the use of buttons and menu selections on the graphical user interface of the station.

The Application models for the CDROM device are shown in Figure 3.2-2.

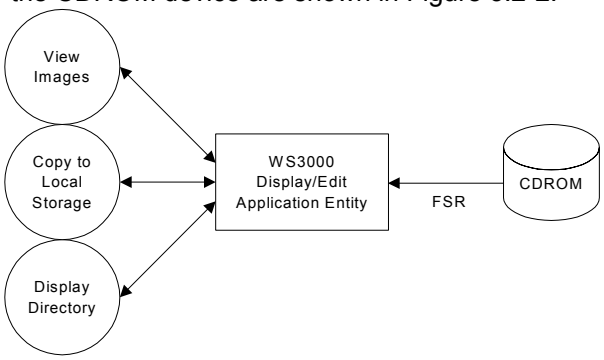

Figure 3.2-2 CDROM Implementation Model

3.2.1.3 Description of the Data Flow Diagram for the MOD device.

The Display/Edit Application Entity (AE) handles the Directory Display, Image Viewing, Study Updating, Study Copying and MOD Creation functionality for the MOD device. The Display/Edit Application Entity (AE) is commanded by the user to perform DICOM Services operating on the DICOM media through the use of buttons and menu selections on the graphical user interface of the station.

The Application models for the MOD device are shown in Figure 3.2-3.

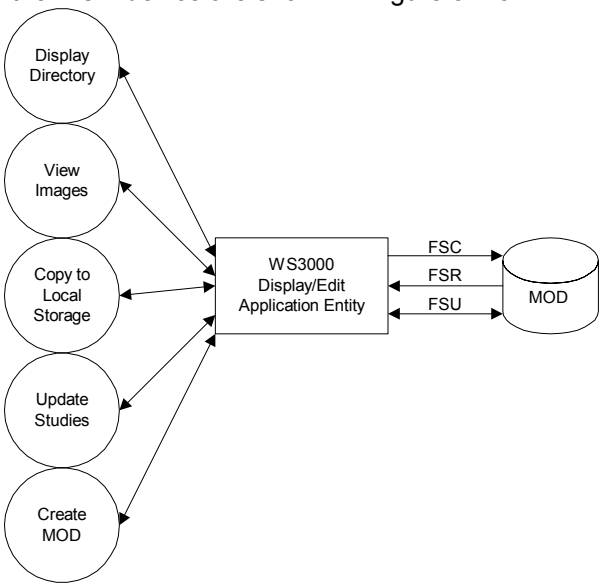

Figure 3.2-3 MOD Implementation Model

3.2.2 Functional Definition of Application Entities

The KinetDx WS3000 has only one Application Entity: the Display/Edit Application.

The Display/Edit Application supports the following functions:

- Display a directory listing of the DICOM File Set (FSR)
- Display images from a DICOM File Set (FSR)
- Copy images from a DICOM File Set (FSR)
- Update or Delete DICOM File Sets (FSU)
- Create DICOM File Set on a CDROM or MOD (FSC)

3.2.3 Sequencing of Real World Activities

For writing on new MODs, it is necessary to format the MOD before the user can write a DICOM File Set.

A DICOM File Set must exist on the media for a DICOM File Set to be updated.

3.2.4 File Meta Information for Implementation Class and Version

The WS3000 Display/Edit Application uses the following implementation identifying parameters:

- File Meta Information Version 1
- Implementation Class UID 1.2.840.113680.3.105
- Implementation Version Name WS3000

3.3 APPLICATION ENTITY SPECIFICATIONS

3.3.1 Display/Edit Application Entity Specification

The Display/Edit Application Entity provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed in Table 3.3-1.

Supported AP's	Real-World Activity	Roles	SC Option
STD-US-ID-MF-MOD128 STD-US-SC-MF-MOD128 STD-US-ID-MF-MOD230 STD-US-SC-MF-MOD230 STD-US-ID-MF-MOD650 STD-US-SC-MF-MOD650 STD-US-SC-MF-CDR STD-XABC-CD STD-CTMR-CD	Display Directory	FSR	Interchange
STD-US-ID-MF-MOD128 STD-US-SC-MF-MOD128 STD-US-ID-MF-MOD230 STD-US-SC-MF-MOD230 STD-US-ID-MF-MOD650 STD-US-SC-MF-MOD650 STD-US-SC-MF-CDR STD-XABC-CD STD-CTMR-CD	View Images*	FSR	Interchange
STD-US-ID-MF-MOD128 STD-US-SC-MF-MOD128 STD-US-ID-MF-MOD230 STD-US-SC-MF-MOD230 STD-US-ID-MF-MOD650 STD-US-SC-MF-MOD650	Copy to Local Storage	FSR	Interchange

Supported AP's	Real-World Activity	Roles	SC Option
STD-US-SC-MF-CDR STD-XABC-CD STD-CTMR-CD			
STD-US-ID-MF-MOD128 STD-US-SC-MF-MOD128 STD-US-ID-MF-MOD230 STD-US-SC-MF-MOD230 STD-US-ID-MF-MOD650 STD-US-SC-MF-MOD650 STD-US-SC-MF-CDR	Update Studies	FSU	Interchange
STD-US-ID-MF-MOD128 STD-US-SC-MF-MOD128 STD-US-ID-MF-MOD230 STD-US-SC-MF-MOD230 STD-US-ID-MF-MOD650 STD-US-SC-MF-MOD650	Create MOD	FSC	Interchange
STD-US-SC-MF-CDR	Create CD-R	FSC	Interchange

Table 3.3-1 Display/Edit Application Entity Profiles, Real-World Activities, and Roles

* Partial Conformance – See 3.3.1.2.2 Real World Activity: View Images

The Display/Edit Application Entity provides support for SOP Classes shown in Table 3.3-2.

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
DICOM Media Storage Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14	1.2.840.10008.1.2.4.70
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
		RLE Lossless Image Compression	1.2.840.10008.1.2.5
		JPEG Lossy, Baseline	1.2.840.10008.1.2.4.50
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
		RLE Lossless Image Compression	1.2.840.10008.1.2.5
		JPEG Lossy, Baseline	1.2.840.10008.1.2.4.50
CT Image	1.2.840.10008.5.1.4.1.1.2	JPEG Lossless Process 14	1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
MR Image	1.2.840.10008.5.1.4.1.1.4	JPEG Lossless Process 14	1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
SC Image	1.2.840.10008.5.1.4.1.1.7	JPEG Lossless Process 14	1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

Table 3.3-2 Supported Media Storage SOP Classes

3.3.1.1 File Meta Information for Display/Edit Application Entity

The KinetDx WS3000 Source Application Entity Title will be the AE Title assigned to the KinetDx WS3000 Workstation.

3.3.1.2 Real World Activities for the Display/Edit Application Entity

The KinetDx WS3000 Display/Edit Application Entity is used for the following real world activities:

- Display Directory Listing - In this activity the Display/Edit Application Entity acts as a File-Set Reader.
- Viewing of Images - In this activity the Display/Edit Application Entity acts as a File-Set Reader.
- Copy to Local Storage - In this activity the Display/Edit Application Entity acts as a File-Set Reader.
- Updating Images - In this activity the Display/Edit Application Entity acts as a File-Set Updater.
- Creating a MOD or CDR - In this activity the Display/Edit Application Entity acts as a File-Set Creator.

3.3.1.2.1 Real World Activity: Display Directory

The KinetDx WS3000 Display/Edit Application is an FSR when reading the directory of the medium. This will result in an overview of the patients, studies and images in the WS3000 Study List.

3.3.1.2.1.1 Media Storage Application Profile for the RWA: Display Directory

For the list of Application Profiles that invoke this AE for the Display Directory RWA, see Table 3.3.-1. There are no extensions or specializations.

3.3.1.2.2 Real World Activity: View Images

The KinetDx WS3000 Display/Edit Application is an FSR when viewing images from the medium.

The WS3000 partially supports the multi-frame ultrasound “image display” Application Profile for MOD and the multi-frame ultrasound “spatial calibration” Application Profile for MOD and CD-R. Table 3.3-3 shows the supported image formats when viewing studies from removable media.

Photometric Interpretation	Transfer Syntax	Bits Allocated	Bits Stored	Samples Per Pixel	Planar Configuration
MONOCHROME2	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	8	8	1	N/A
	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	16	16	1	N/A
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	8	8	1	N/A
	JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.70	8	8	1	N/A

Photometric Interpretation	Transfer Syntax	Bits Allocated	Bits Stored	Samples Per Pixel	Planar Configuration
	JPEG Lossy Baseline (Process 1) 1.2.840.10008.1.2.4.50	8	8	1	N/A
RGB	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	8	8	3	0 - Chunky
	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	8	8	3	1 - Planar
PALETTE COLOR	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	8	8	1	N/A
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	8	8	1	N/A
	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	16	16	1	N/A
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	16	16	1	N/A
YBR_FULL	Uncompressed Explicit VR Little Endian 1.2.840.10008.1.2.1	8	8	3	0 - Chunky
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	8	8	3	0 - Chunky
	RLE Lossless Image Compression 1.2.840.10008.1.2.5	8	8	3	0 - Planar
YBR_FULL_422	JPEG Lossy Baseline (Process 1) 1.2.840.10008.1.2.4.50	8	8	3	0 - Planar
	JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.70	8	8	3	0 - Planar

Table 3.3-3 Media Review Supported Image Formats

3.3.1.2.2.1 Media Storage Application Profile for the RWA: View Images

For the list of Application Profiles that invoke this AE for the View Images RWA, see Table 3.3-1. There are no extensions or specializations.

3.3.1.2.3 Real World Activity: Copy to Local Storage

The KinetDx WS3000 Display/Edit Application is an FSR when copying studies from the medium to local storage. The Display/Edit Application will copy any SOP Instance from the medium directory list to local storage.

3.3.1.2.3.1 Media Storage Application Profile for the RWA: Copy to Local Storage

For the list of Application Profiles that invoke this AE for the Copy to Local Storage RWA, see Table 3.3 -1. There are no extensions or specializations.

3.3.1.2.4 Real World Activity: Update Studies

The KinetDx WS3000 Display/Edit Application is an FSU using the Interchange option when adding or deleting studies to the medium. The Display/Edit Application will copy any SOP Instance from Local Storage to the medium. The KinetDx WS3000 Display/Edit Application will delete any study displayed in the directory of the medium.

The Display/Edit Application cannot delete studies from a CD-R.

The Display/Edit Application cannot add or delete studies to MOD media that has been write-protected.

3.3.1.2.4.1 Media Storage Application Profile for the RWA: Update Studies

For the list of Application Profiles that invoke this AE for the Copy to Local Storage RWA, see Table 3.3-1. There are no extensions or specializations.

3.3.1.2.5 Real World Activity: Create MOD

The KinetDx WS3000 Display/Edit Application will act as an FSC when creating an MOD. A DICOMDIR is created and studies can be exported to the MOD (See RWA: Update Studies.)

3.3.1.2.5.1 Media Storage Application Profile for the RWA: Create MOD

For the list of Application Profiles that invoke this AE for the Create MOD RWA, see Table 3.3-1. There are no extensions or specializations.

3.3.1.2.6 Real World Activity: Create CD-R

The KinetDx WS3000 Display/Edit Application is an FSC when creating a CD-R. A DICOMDIR is created and studies can be exported to the CD-R (See RWA: Update Studies.)

3.3.1.2.6.1 Media Storage Application Profile for the RWA: Create MOD

For the list of Application Profiles that invoke this AE for the Create CD-R RWA, see Table 3.3-1. There are no extensions or specializations.

3.4 AUGMENTED AND PRIVATE APPLICATION PROFILES

The KinetDx WS3000 Workstation has no augmented or private Application Profiles.

3.5 EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

The KinetDx WS3000 Workstation has no extensions, specializations or privatizations of SOP Classes and Transfer Syntaxes.

3.6 CONFIGURATION

The Source AE Title encoded in the File Meta Information is derived from the AE Title of the workstation.

3.7 SUPPORT OF EXTENDED CHARACTER SETS

The KinetDx WS3000 Workstation supports the following character sets:

- ISO-IR 6 (default) Default repertoire
- ISO-IR 100 Latin Alphabet No. 1

The KinetDx WS3000 Workstation does not support multi-byte characters.